

Microbiological study of ice-creams sold at nanded city of Marathwada Region of Maharashtra State

Raj kumar S Sonwane

Department of Dairy Science, Yeshwant Mahavidyalaya, Nanded, MS, India

Abstract

The aim of the study was to determine the microbiological evaluation of Ice-cream sold in different areas of Nanded city. To achieve the objectives of the present study the Ice-cream samples were subjected to analyse microbiological status. Random samples of Ice-cream were collected from the 4 Areas namely Troda (Bk), Anandnager, Shivaji nagar (Branded), Anand nagar (Branded) of Nanded city. Microbial evaluation was done by examining Standard Plate Count (SPC), coli form count. Unorganised section of ice-cream was found to be higher than FSSAI values. SPC ranged from 74×10^5 cfu/ml to 96×10^5 cfu/ml. Microbial quality of Organized Branded Ice-cream sample was found to be satisfactory when compared with FSSAI.

Key Words: Ice-cream, cost factor and profit margin, standard plate count, coliform count.

Introduction

Milk and Milk products are important sources of transmissions of various pathogenic microorganisms in human beings. APHA (American public health association) recommends the Standard plate count (SPC) as the Official method in its ordinance and code. Sanitary quality of food can be chaked by bacterial count in food.

Ice cream is an important food product but most of the manufactures donot follow hygienic conditions during production sorage and transport this may arise many health issues to consumers (Sebastian *et al.* 1975; Reddy *et al.* 1994; Keller *et al* 1987) ^[10, 8] analyzed 340 dairy Ice-cream samples and found that 99% of the sample had bacterial count less than 55000/gram. P.R.S. Moorthy, and R. Balachandran (1992) ^[13] worked on Ice-cream Industry and its future scope in India in1993 took stock of the production and scope for expanding the supply. The various strategies that will help to increase the market potential in view of the growing competition from other players. The study also focuses on certain non-conventional stabilizers and their effect on ice-cream mix. (Chand Subhash, Dixit, P. K., and Singh, R. V. 1999) ^[2] bought out a case study in1999on Marketing Management of Ice-cream in Bangalore. The case study focuses on the marketing and advertising strategies for sales promotion of ice-cream. The pricing strategies and a distinct packaging and flavours which dairy industries can adopt during the marketing of Ice-cream. (Vinay Kamath, 2002) ^[7] Traced out the reasons for profitability of HLL and now known as Hindustan Liver Ltd. The strategy of promoting Kwality Walls as an umbrella brand for its ice creams, rather than a product-driven promotion, has worked to a nicety to the company. (Sindhu J. Bhattacharya, 2004) ^[14] Explored the reasons for MNCs to penetrate into the ice cream market in India. The study has come up with ways and means of achieving the success despite the hurdles. (Robert Marshall, T.Douglas Goff, Richard W. Hartel 2003) worked on Ice-

cream industry in 2003 US market which has been well developed after the initial introduction of the product by Europe. The study has traced the history, composition and properties, features of ice-cream industry which has been well developed market. The study also analyses the production and consumption pattern of ice-cream in the country. Davis, C.G., Blayney, D.P., Yen, S.T., & Cooper, J. (2009) ^[3] study deals with an analysis of at-home demand for ice cream in the United States was to determine the effect that changes in retail prices and consumer income have on at-home ice cream consumption. The analysis was based on Nielsen 2005 home scan retail data and used marital status, age, race, education, female employment status, and location in the estimations of aggregate demand elasticity. Chitra Unnithan, (2010) ^[15] emphasized the need for a sustainable innovation in tune with changing time and trends. The commercial success of business depends upon the value creating-ways. The successful innovation in turn hinges on state-of-art ice cream plants employed by the firms. Thus there are very few studies on the Ice-cream Market in India that really analyses the trends in the market and challenges faced by the players in the highly competitive environment. The present paper taken up with the following objectives in mind.

The objectives

To study microbial quality of ice-cream sold in Nanded city.

The methodology

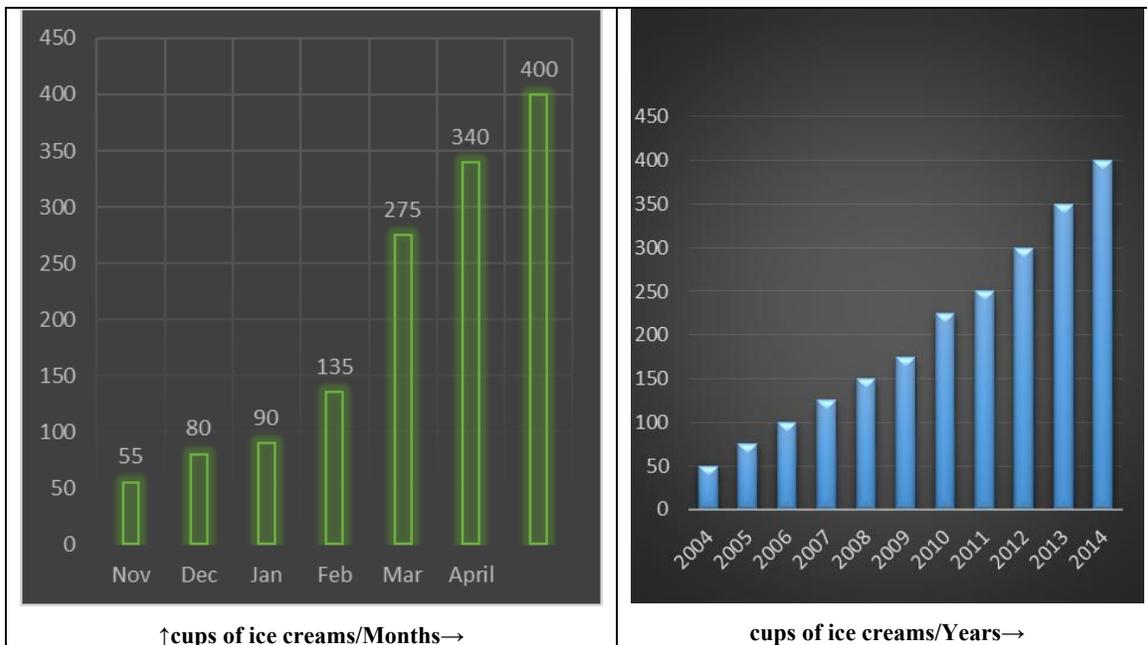
During the study of ice-cream, the sample collected from Nanded city to check the microbial growth mainly studied comparatively that is organized Vs unorganized. So organized ice-creamlike Dinashas-vanilla, Amul's-butter scotch-land and unorganized ice-cream that sample collected from Nanded city.

1 gm of each ice-cream samples was suspended in 100ml of sterile water and dilution were made as 10^{-1} , 10^{-2} , 10^{-3} , 10^{-4} , 10^{-5} up to 10^{-10} each dilution was inoculated on Macconkey's agar plate in triplicate and incubated at 37 °C for 24 hours after incubation the colonies were counted (RC Dubey and D.K. Maheshwari, 2004) ^[9].

The standard plate count method consists of diluting a sample with sterile saline or phosphate buffer diluents until the bacteria are dilute enough to count accurately. That is, the final plates in the series should have between 25 and 250 colonies. Fewer than 25 colonies are not acceptable for statistical reasons, and more than 250 colonies on a plate are likely to produce colonies too close to each other to be distinguished as distinct colony-forming units (CFUs).The assumption is that each viable bacterial cell is separate from all others and will develop into a single discrete colony (CFU). Thus, the number of colonies should give the number of live bacteria that can grow under the incubation conditions employed.

The secondary data collected from the various shopkeepers. The collected data is tabulated and analyzed to arrive at

meaningful and logical conclusion.



Cost factor and profit margin

An ice-cream mix costs about Rs 60-65 per liter. Adding up to it one liter of air then per liter mixture would approximately cost Rs 32. If one takes 150ml cup will end up making 13 cups of ice creams from one liter of mixture costing about Rs 5 per cup. If one adds Rs 5 worth of cost of electricity, cold storage, transports packaging and advertisement cost etc. The cost final cup turns out to be Rs15. Considering the variety in offering the profit margin can go even up to 200 percent. For the bigger shopkeepers the distribution and advertisement into their profit margin and for small shopkeepers, it is the volumes that matter. It is highly profitable business thanks to incorporation a considerable quantity of air during hardening process to make soft and creamy. Moreover the cost of setting up of a small ice-cream plant will not cost more than 10 lakhs including the cost of plant, labour, storage freezers and so on.

Organized vs. unorganized sector of ice-cream

Keeping the view of transaction of unorganized sector was very interesting most of ice-cream manufacturer were no more Knowledge of ice-cream Production the workers are worked on very low Salary and the owner enjoying profit by selling the Ice-cream without following the PFA/ FSSI Std.

The same owner of Manufacture ice-cream has been sold the cups on Rs. 5/- per cups on an average near about 10years. The most wondering thing is that the same Manufacturer or owner about Rs. 5_ price having same technology is following the no legal condition of mnufacting which hazardous to the health of ice-cream consumer from many years.

Last 10 years ago the selling price Market milk was nearly about Rs. 7-8 per lit now a days it has been reached about Rs. 40-44 per lits. Now a days the selling price in case of Cream Rs 165 per kg Branded but the same qty was sold on Rs 40-50

per kg the other ingredients price rates like cane Sugar was Rs. 4-5per kg now Rs. 35-40 per kg etc.

The ingredient cost of production was increasing at increasing rate last 10 years scenario of market the ice-cream the production cost is unchanged.

Considering the all above factors like load shading, unorganized sector of market and distributor Margin due to increasing the price Ice -cream ingredients, all profit taken by the distributor in addition to that un organized marketing due to all above fact no new Entrepreneur invest money in ice making unit.

Result and Discussion

Last 10 years ago Ice-cream Market in Nanded city was very few retailers shop were selling at respective places with very low demand due to unawareness of ice-cream brands Tests and knowledge of ice-cream Industry.

Now Nanded is big market for ice-cream consumption near about 400 outlets of ice-cream retailers shop are selling with various brands with different rates and flavors. On an average 30-35 cups sold in winter while 120-150 cups in summer daily selling as well as consumption of ice cream transaction in organized sectors of ice cream industry sector at Nanded about Rs12 Lakh.

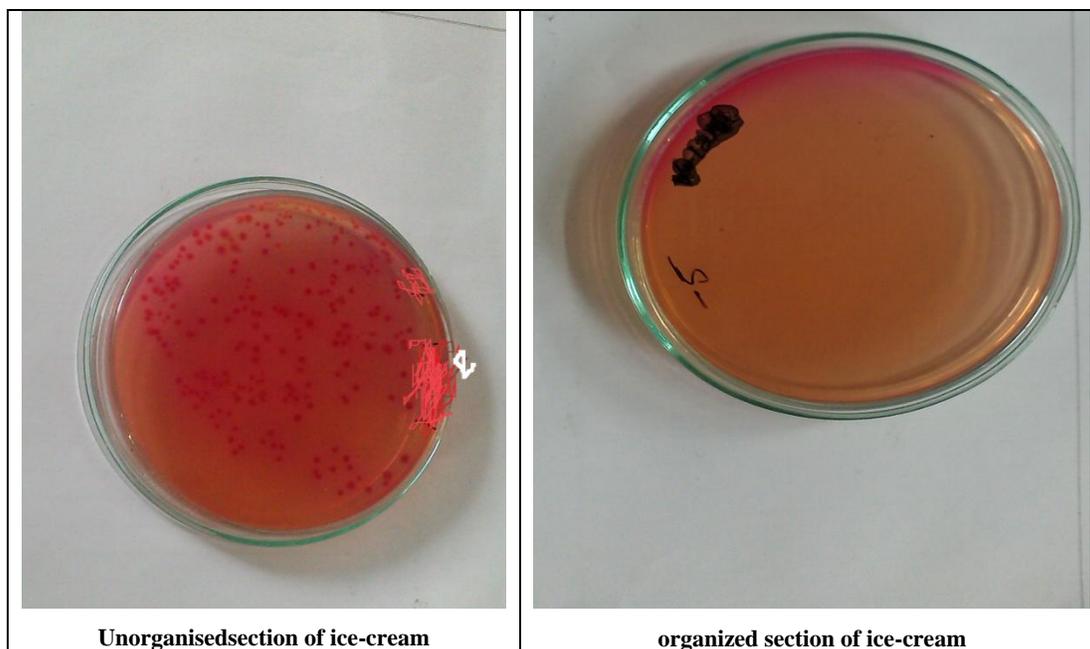
Microbiological quality of market Ice-cream samples further revealed that majority of Ice-cream samples were possessed relatively higher and alarming figures with respect to SPC and Coli form counts. The standard plate counts of Unorganisedsection of Ice-cream were quite higher than the organized section of ice-cream branded Ice-cream samples (Table 2). The viable counts of bacteria in present study were lower reported by Deshmukh *et al.* (2006) ^[16] analyzed Ice cream samples of Nanded city and determined SPC and Coli form (log/gm) and it was found to be 7.59 and 2.25 respectively. A great variation was noticed in coli form

counts of market Ice-cream. The presence of coliform organism in Ice-cream is an obvious indication of post-production contamination which might be due to prevailing unhygienic conditions in manufacturing coupled with faulty storage measures adopted by the retailers. However, higher coli form counts have been reported Anuranjini *et al.*, (2008) [1] also reported the incidence of high coli form count in ice creams marketed in Mangalore town. Ice-cream samples. Hence it seems that the Ice-cream handling is comparatively better in areas nearby Nanded city.

The total viable counts in samples of the four locations of Nanded are presented in Table 1.

Table 1:

Shivaji nagar (Branded)	0
Anand nagar (Branded)	0
Tharoda naka (Branded)	0
Baba Nagar (Branded)	0
Shivaji nagar (Unbranded)	80 x 10 ⁻⁵ cfu/ml
Anand nagar (Unbranded)	74 x 10 ⁻⁵ cfu/ml
Tharoda naka (Unbranded)	89 x 10 ⁻⁵ cfu/ml
Baba Nagar (Unbranded)	96 x 10 ⁻⁵ cfu/ml



The results obtained in this study represent the current status of microbiological quality of ice cream being sold in Nanded. All the analyzed unorganized ice cream samples (n =10) Showed heavy contamination of notable bacteria which indicates fecal contamination, organized ice-cream show no growth. The presence of this high level of fecal coli forms contamination represents a public health risk due to the possible presence and transmission of pathogens such as enteric pathogenic *Escherichia coli*, may also be present in the ice cream (Arias and Windrants, 2000). The mode of transmission of all these bacteria is fecal-oral route and or via common house flies.

The results suggest negligence such as poor sanitation during the preparation and/or storage of these products. These include the observed dirty premises and utensils used the use of bare hands in preparing the products (personal communication with the handlers).

Conclusion

In the present study, it was concluded that Branded ice-cream does not show any microbial growth. But in case of the unbranded ice-cream microbial growth does exceed FDA instruction but which is hazardous for public health.

Ice-cream which marketed in Nanded city was investigated with the object to know the quality. Standard plate count test

is performed to check the microbial load present in. Organized and unorganized ice-cream. The quality of organized ice-cream marketed in Nanded city is safe for human consumption and unbranded ice-cream have large microbial load so that this ice creams are hazardous for public health.

The ice-creams consumption levels have been pretty low in Nanded city marathwada region Maharashtra state given the strength of population and a favorable weather conditions. To control the unorganized sector for play with public health. Need to provide sufficient electricity, subsidy on raw material for new ice-cream production plant.

Reference

1. Anuranjini C, Sebastian Geethu B, Dhanashree BS. Bacteriological analysis of ice creams from Mangalore, South India. *Indian J. Med. Res.* 2008; 127:91-92.
2. Chand Subhash Dixit PK, Singh RV. Marketing management of ice cream in Bangalore: A case study, *J. of Dairying, Foods and Home Sci.* 1999; 18(1):22-26
3. Davis CG, Blayney DP, Yen ST, Cooper J. An analysis of at-home demand for ice cream in the united States, *Journal of Dairy Science.* 2009; 92(12):6210-6216
4. De Boer K, Pandey A. India's sleeping giant: *Food McKinsey Quarterly, Great Britain,* 1997; 1:82-97.

5. Funderburg AC. Chocolate, Strawberry and Ice-cream, Bowling Green State University Popular Press, Bowling Green, OH P, 1995, 211.
6. <http://www.indiastat.com/table/marketforecast/10143/processedfood/10396/10401/data.asp> (accessed on 20 March 2010)
7. Kamath V. HLL Tastes the Cream Finally, The Hindu Business Line 21st August, 2002, 4.
8. Keller JJ *et al.* cited from Dairy Sci. Abstr. 1987-1988; 50:413.
9. Dubey RC, Maheshwari DK. Practical Microbiology S. Chand and Company, New Delhi, 2004.
10. Reddy BB *et al.* Indian Journal of Dairy sci. 1994; 47(3):215-218
11. Sebastain J *et al.* J. Food Sci Technology. 1995; 12:202.
12. Marshall RT, Goff DH, Hartel RW. Ice cream, Sixth edition Kluwer Academic/Plenum Publishers, New York, 1932, 17.
13. Moorthy PRS, Balachandran R. Certain non – conventional stabilizers- their effect on whipping ability of ice-cream mix, Cheiron, 1992; 21(5-6):180-182.
14. Sindhu Bhattacharya J. The Ice Cream Punch, the Hindu Business Line, 2004, 6.
15. Unnithan C. Ice cream brands offer hot picks, Business Standard, 2010, 6.
16. Deshmukh YD, Prita Borkar S, Srinivasa Hao H, Khobragade CN. Biochemical Evaluation of ice-cream samples J. Dairying. Foods & H.5., 2006; 25(1):76-78.